National Institute of Environmental Health Sciences

Observed magnified runoff response to rainfall intensification under global warming

Author(s): Huang JC, Lee TY, Lee JY
Year: 2014
Journal: Environmental Research Letters : Erl. 9 (3): 34008

Abstract:

Runoff response to rainfall intensification under global warming is crucial, but is poorly discussed due to the limited data length and human alteration. Historical rainfall and runoff records in pristine catchments in Taiwan were investigated through trend analysis and cross temperature difference analysis. Trend analysis showed that both rainfall and runoff in the 99.9-percentile have been significantly increasing in terms of frequency and intensity over the past four decades. Cross temperature difference analysis quantified that the rainfall and runoff extremes (including the 99.0-99.9-percentiles) may increase by 69.5% and 99.8%, respectively, under a future scenario of 1 degrees C increase in temperature. This increase in intensity resembles the increase in intensity observed between 1971-1990 and 1991-2010. The amplified runoff response can be related to the limited catchment storage capacity being preoccupied by rainfall extremes. The quantified temperature effect on rainfall and runoff intensification can be a strong basis for designing scenarios, confirming and fusing GCMs' results. In addition, the runoff amplification should be a warning for other regions with significant rainfall intensification. Appropriate strategies are indispensable and urgently needed to maintain and protect the development of societies.

Source: http://iopscience.iop.org/article/10.1088/1748-9326/9/3/034008

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security, Precipitation

Geographic Feature:

resource focuses on specific type of geography

Freshwater, Ocean/Coastal

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China, Other Asian Region

Other Asian Region: Taiwan

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content